Challenge:

- How can we use our knowledge of earthquakes together with burgeoning data streams to provide the most accurate and useful information to the public and to officials in the event of heightened activity in Cascadia?

USGS science for a changing world

Steps after occurrence of activity:

- Detection and characterization
  - Some automatic (eq locations, some moment tensors)
  - Some quick, but require human interaction (moment tensors, depths)
  - Some characterization done later on research basis
- Automatic communication to outside world
  - Noncontroversial "facts"
  - Pre-agreed interpretations regarding what is likely to happen
- Pre-planned actions
  - public safety
  - Enhanced monitoring and data collection
- Detailed interpretation by experts
- Communication of the interpretations
- Process likely ongoing for months or years

USGS science for a changing world

NEPEC Roles

- Detection and characterization: Assess current capabilities and make recommendations for most important improvements
  - -e.g., better depths for events near CA/OR border
- Automatic communication to outside world
  - Noncontroversial "facts": Enhance - using databases that support National Hazard Maps
  - Pre-agreed interpretations regarding what is likely to happen: Develop these
- Pre-planned actions
  - public safety: be sure officials know what information to expect - they can plan
  - Enhanced monitoring and data collection: make recommendations
- Detailed interpretation by experts: Convene experts for teleconference
  - Use graphics, GIS, data displays, not just phone conversation
- Communication of the interpretations: joint with public officials
- Process likely ongoing for months or years: maintain people and procedures that outlast reorganizations and careers, promote research

USGS science for a changing world

Where we are now

- CA, OR and WA, and BC Emergency Managers and Geological Surveys are aware of issues, eager to plan
  - However, OR, WA, and BC mainly focused on response to damaging event, not anticipatory advisory-type information
- Jim Goltz initiating effort to obtain funding for "catastrophic earthquake planning", including development of scenarios that are more than just a single giant earthquake
  - Funding needed for out-of-state travel by state personnel
  - Issue of whether California should lead - federal responsibility?
- NEPEC: appoint subcommittee of regional experts -?
- USGS: monitoring enhancements needed
  - Software to visualize diverse data types/ ARRA funding
  - Protocols for communication among non-USGS monitoring groups

USGS science for a changing world

Charge to Subcommittee

- Envision comprehensive set of plausible possibilities for Cascadia sequences
  - Seismic sequences, aseismic events
- Agree on what can be said about the time-dependent short-term probability of a damaging earthquake during such sequences
  - place confidence limits
  - Decide what data and analyses would be needed in real time
- Prepared written statements for automatic release when an event that meets specified criteria occurs.
  - Unappetizing, but necessary
- Convene rapidly to discuss specific occurrences

USGS science for a changing world

Suggested Members/Specialties

(in addition to NEPEC members local USGS scientists)

- Herb Dragert, Geological Survey of Canada
- Takeshi Sagiya, Geographical Survey Inst (subduction zone geodetic monitoring)
- Kerry Sieh (paleoseismology, subduction sequences)
- Hiroo Kanamori
- Lori Dengler (Northern CA hazards)
- George Priest, DOGAMI (retired)
- Steve Kirby (subduction zone physics)
- "Teleseismologist" - expert analyst of teleseismic signals from very large events
- John Pallister - volcano connection; experience with real-time responses to volcanic crises

USGS science for a changing world

Cascadia Policy Challenges

- 3 states, 2 countries involved
- State emergency management agencies (and FEMA) unprepared to receive "advisory" information
  - OR and WA have no experience with earthquake "advisories"
  - CA seems less prepared to use advisory information than in the past
- Many organizations collect, monitor data, but synthesis not routine
  - Earthquake monitoring by PNSN, NCSN, and national network
  - Tremor detection & location - UW, GSC
  - GPS (PBO, other operators, CWU analysis)
  - Strain (PBO data, USGS analysis)
- Advisories could potentially arise from
  - Potential foreshocks
  - Accelerated aseismic slip - very little basis for evaluation
- Emphasis is on "The Big One" - whereas a Cascadia megathrust sequence might very well include more than one event of M>8

USGS science for a changing world